

Evidence of localized strong enhancements in lower stratospheric CH₃CN following intense forest fire activity.

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On 24 August 1992, the Microwave Limb Sounder (MLS) on the Upper Atmosphere Research Satellite observed a significant enhancement in the abundance of lower stratospheric methyl cyanide (CH₃CN) at ~100-68 hPa (16-19 km altitude) in a small region off the coast of Florida. Concentrations of order 1400 parts per trillion by volume (pptv) were observed, compared to a typical stratospheric background level of 30 pptv. Observations of additional atmospheric constituents, together with trajectory calculations, provide strong evidence that this enhancement arose from the stratospheric injection, by severe thunderstorms, of air with high CH₃CN concentrations originating in regions of extensive forest fire activity in Idaho (not observed by MLS in this period because of orbital geometry). After being lofted into the lower stratosphere, this air was advected towards the regions observed by MLS, and subsequently dispersed over ~5 days. No other events of comparable magnitude have been seen in the ~8 year MLS dataset.